DRAFT

San Jacinto River: EPA Modeling Workshop #1

Model Structure, Development and Calibration Strategy

- Review modeling objectives
- Overview of model structure
    o Hydrodynamic model
        ▪ EFDC ➔ general capabilities
        ▪ 2-D vertically-averaged mode
    o Sediment transport model
        ▪ SEDZLJ ➔ general capabilities
        ▪ Cohesive and non-cohesive suspended load transport
    o Chemical fate and transport model
        ▪ QEAFATE ➔ general capabilities
    o Linkages between 3 models
    o Application to other sites
- Hydrodynamic model
    o Numerical grid and model domain
    o Bathymetry and geometry
    o Boundary conditions
        ▪ Upstream inflow at Lake Houston Dam
        ▪ Water surface elevation at downstream boundary
    o Calibration strategy
        ▪ Use ADCP data collected during 2010 and 2011
- Sediment transport model
    o Review of model structure/theory
        ▪ Cohesive bed ➔ SEDZLJ
        ▪ Non-cohesive bed ➔ van Rijn suspended load transport
    o Sediment properties
        ▪ 4 size classes
    o Bed properties
        ▪ Delineation of cohesive and non-cohesive bed areas
        ▪ Spatial distribution of bulk bed properties
            • Initial conditions for composition
            • Dry density
            • D50 (non-cohesive bed)

- Erosion rate parameters for cohesive bed
  - Analysis of Sedflume data
- Incoming sediment load at upstream boundary
  - Magnitude ➔ rating curve based on analysis of USGS data
  - Composition ➔ analysis of USGS data
- Calibration strategy
  - Primary calibration target: NSR
    - Analysis of radioisotope cores to estimate NSR
  - Secondary calibration target: TSS concentration
    - Low-flow data collected at ISCO
  - Discuss inputs and parameters to adjust during calibration
- Chemical fate and transport model
  - Review of model structure/theory
  - Selection of chemicals to simulate
  - Initial conditions
    - Spatial distribution of chemical bed concentrations
  - Boundary conditions
    - Chemical concentrations at upstream and downstream boundaries
    - Point and non-point loads
  - Simulation of Partitioning
  - Specification of key chemical fate and transport parameters
    - Organic carbon
    - Mass transfer processes in sediment bed
    - Other parameters (water temperature, volatilization, etc.)
  - Calibration strategy
    - Key calibration targets: spatial and temporal patterns in sediment and water column data
    - Discuss inputs and parameters to adjust during calibration
- Analysis of relationships between biota, sediment, and water column